

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of the claims:

1. (Currently Amended) An isolated polynucleotide that encodes a human β 1A_sodium channel subunit protein, said polynucleotide comprising a ~~member~~ sequence selected from a the group consisting of:

(a) a polynucleotide ~~having at least a 75% identity to a polynucleotide encoding a polypeptide consisting of amino acids 1 to 268 of SEQ.ID.NO. SEQ ID NO:14;~~ and

(b) a polynucleotide ~~having at least 75% identity to a polynucleotide encoding a polypeptide consisting of comprising amino acids 150 to 268 of SEQ.ID.NO. SEQ ID NO:14;~~

(c) a polynucleotide which is complementary to the polynucleotide of (a) or (b); and

(d) a polynucleotide comprising at least 15 sequential bases of the polynucleotide of (a), (b), or (c).

2. (Original) The polynucleotide of claim 1 wherein the polynucleotide is RNA.

3. (Original) The polynucleotide of claim 1 wherein the polynucleotide is DNA.

4. (Currently Amended) The polynucleotide of claim 1, having a nucleotide sequence selected from a the group consisting of+
(~~SEQ.ID.NO.~~ SEQ ID NO:12) and (~~SEQ.ID.NO.~~ SEQ ID NO:13).

5. (Currently Amended) The polynucleotide of claim 41 further having a nucleotide sequence selected from the group consisting of allelic variants, mutants, and functional derivatives of
(~~SEQ.ID.NO.~~ SEQ ID NO:12) and allelic variants of (~~SEQ.ID.NO.~~ SEQ ID NO:13).

6. (Currently Amended) The polynucleotide of claim 1, wherein said ~~DNA molecule~~ polynucleotide is genomic DNA.

7. (Currently Amended) An expression vector for expression of a human β 1A sodium channel subunit protein in a recombinant host, wherein said vector contains a recombinant gene polynucleotide encoding a ~~human β 1A sodium channel subunit protein and functional derivatives thereof~~ SEQ ID NO:14.

8. (Currently Amended) The expression vector of claim 7,
wherein the expression vector contains a ~~cloned gene~~
polynucleotide encoding a ~~Human~~ human β 1A sodium channel subunit
protein, said polynucleotide having a nucleotide sequence
selected from a the group consisting of: ~~(SEQ.ID.NO.~~ SEQ ID
NO:12), SEQ ID NO:13, allelic variants of SEQ ID NOS:12 or 13,
and (SEQ.ID.NO.:13) functional derivatives of SEQ ID NOS:12 or
13.

9. (Currently Amended) The expression vector of claim 8,
wherein the ~~group further consists of allelic variants, mutants,~~
~~and functional derivatives of~~ nucleotide sequence is
~~SEQ.ID.NO.~~ SEQ ID NO:12 and/or SEQ.ID.NO. SEQ ID NO:13.

10. (Currently Amended) The expression vector of claim 7,
wherein the expression vector contains genomic DNA encoding a
~~Human~~ human β 1A sodium channel subunit protein of SEQ ID NO:14.

11. (Currently Amended) A ~~recombinant~~ host cell containing a
~~recombinantly cloned gene~~ recombinant polynucleotide encoding a
~~Human~~ human β 1A sodium channel subunit protein of SEQ ID NO:14
or a functional derivative thereof.

12. (Currently Amended) The ~~recombinant~~ host cell of claim 11, wherein said gene polynucleotide has a nucleotide sequence selected from a the group consisting of: ~~(SEQ.ID.NO.:12), SEQ ID NO:12, (SEQ.ID.NO.:13)~~, and ~~SEQ ID NO:13 functional derivatives thereof.~~

13. (Currently Amended) The ~~recombinant~~ host cell of claim 11, wherein said ~~cloned gene~~ polynucleotide is genomic DNA.

14. (Withdrawn) An isolated protein encoded by a nucleic acid sequence capable of hybridizing under stringent hybridization conditions to a nucleotide sequence having the sequence of SEQ ID NO:12 or SEQ ID NO:13 that when combined with a Human α sodium channel subunit protein in a cell permits sodium ion flux in the cell.

15. (Withdrawn) The protein according to claim 14 , having an amino acid sequence selected from a group consisting of: ~~(SEQ.ID.NO.:14)~~ and functional derivatives thereof.

16. (Withdrawn) A monospecific antibody immunologically reactive with a human β 1A sodium channel subunit protein.

17. (Currently Amended) A process for ~~expression of expressing~~ a ~~Human~~ human β 1A sodium channel subunit protein in a ~~recombinant~~ host cell, comprising:

(a) introducing an expression vector encoding a human β 1A sodium channel subunit protein, into a cell, wherein the vector comprising comprises a nucleic acid sequence capable of hybridizing ~~under stringent hybridization conditions~~ to a nucleotide sequence, ~~or its complementary sequence~~, having the sequence of SEQ ID NO:12 or SEQ ID NO:13 ~~into a cell, or its complementary sequence, wherein the hybridization conditions comprise~~ incubation in 50% formamide, 6X SSC, 1% SDS at 42 C for 12-19 hours, washing in at least two successive washes at 22 C, followed by stringent washes at 65 C in a buffer of 0.04M sodium phosphate, pH 7.2, 1% SDS and 1mM EDTA;

(b) culturing the cell of step (a) under conditions which allow expression of a protein encoded by the ~~nucleotide sequence~~ expression vector.

18. (Withdrawn) A method of screening for a modulator of sodium channel activity comprising:

- (a) providing a cell that co-expresses a protein encoded by a nucleic acid capable of hybridizing under stringent hybridization conditions to a nucleotide sequence, or its complementary sequence, represented by SEQ ID NO:12 or SEQ ID NO:13 and a sodium channel α subunit protein wherein the cell elicits a sodium ion flux;
- (b) contacting the cell with a putative $\beta 1A$ modulating compound; and
- (c) measuring a change upon the cell that alters the sodium ion flux.

19. (Withdrawn) The method of claim 18 wherein at least one of the proteins is a recombinant protein.

20. (Withdrawn) The method of claim 18 wherein the change in sodium ion flux is selected a group consisting of:

- (a) increasing the capacity to open the Na channel;
- (b) decreasing the capacity to open the Na channel;
- (c) increasing the rate of desensitization;
- (d) decreasing the rate of desensitization;

(e) increasing the rate of re-sensitization of the channel;

(f) decreasing the rate of re-sensitization of the channel;

(g) increasing the level of β 1A protein expression;

(h) decreasing the level of β 1A protein expression;

(i) increasing the level of the α/β 1A complex protein expression; and

(j) decreasing the level of the α/β 1A complex protein expression.

21. (Withdrawn) A compound that modulates the function of human β 1A selected using the method of claim 18.

22. (Withdrawn) A pharmaceutical composition comprising a compound of claim 19.

23. (Withdrawn) A method of treating neuropathic pain in a patient in need of such treatment comprising administration of a modulating compound of Claim 21.

24. (Withdrawn) A method of treating neuropathic pain in a patient in need of such treatment comprising altering the level

of a human β 1A subunit in a dorsal root ganglia cell in the patient.

25. (Withdrawn) A method of treating chronic pain in a patient in need of such treatment comprising administering the compound of Claim 21.

26. (Withdrawn) A method of treating febrile seizures in a patient in need of such treatment comprising administering the compound of Claim 21.

27. (Withdrawn) A method of treating general epilepsy in a patient in need of such treatment comprising administering the compound of Claim 21.

28. (Withdrawn) An anticonvulsant pharmaceutical composition comprising a compound of claim 21.

29. (Withdrawn) A method of treating arrhythmia in a patient in need of such treatment comprising administering the compound of Claim 21.

31. (Withdrawn) A pharmaceutical composition comprising a compound of claim useful for use as a local anesthetic.

32. (Withdrawn) A method for decreasing neuropathic pain in an individual comprising administering to said individual a modulator of a sodium channel β 1A subunit in an amount effective to change the sodium channel activity in said individual.

33. (Withdrawn) The method of claim 31 wherein said modulator decreases the expression of sodium channel β 1A subunit in the cells of said individual.

34. (Withdrawn) A method for treating neuropathic pain in a subject comprising altering the level of sodium channel β 1A subunits on the surface of a cell in a subject.

35. (Withdrawn) A method for decreasing neuropathic pain in a human comprising the step of administering a sodium channel β 1A subunit-binding molecule to a sodium channel β 1A subunit-expressing cell in the human.